

Computational Aspects of Molecular Science

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Objective

Construct the first automated molecular computer

- Ascertain the feasibility of the Sticker Model.
- Design and optimize methods and materials.
- Solve computational problems and build computational devices.

Approach

- Investigate two basic approaches for achieving low error rate separation
 - Attach DNA probes to solid support and capture target DNA by hybridization
 - Probes chemically bound to accessory molecules and placed in solution with target.
- Design and build a nucleic acid library for DNA computations
- Solve a 10 variable SAT problem manually
- Build a prototype DNA computer to solve a SAT problem using robotic technology

Schedule

Year One:

- Design, construction and testing of a nucleic acid library to perform a multivariable SAT calculation.
- Fabrication of solid supports containing attached DNA sequences.

Year Two:

- Manual solution of a multivariable SAT problem.

Year Three:

- Construction of a robotically controlled DNA computer using commercially available components.